

WHAT IS CLAIMED IS:

*B Subj*  
1. A process for removing an organic ARC on a metallic layer, comprising exposing the ARC to an oxygen-free system of etching agents in an ionized state in a reaction chamber of a plasma generating device, the system of etching agents including one or more fluorine-containing compounds, chlorine and an optional inert carrier gas.

2. The process of Claim 1, wherein the one or more fluorine-containing compounds is selected from the group consisting of  $\text{CF}_4$ ,  $\text{CHF}_3$ ,  $\text{C}_2\text{F}_6$ ,  $\text{CH}_2\text{F}_2$ ,  $\text{SF}_6$ , and  $\text{C}_n\text{F}_{n+4}$ .

*Suji A1*  
3. The process of Claim 1, wherein the ARC is exposed by channels forming an interconnecting network previously etched in a photoresist covering the ARC.

*A*  
*essentially  
essential*  
4. The process of Claim 1, wherein the system of etching agents consists of  $\text{CHF}_3$ , Ar, and  $\text{Cl}_2$ .

*12*  
5. The process of Claim 4, carried out within the following window:

Pressure	--	about 1 to about 100 millitorr
Temperature	--	about $30^\circ$ to about $80^\circ \text{ C}$
$\text{Cl}_2$ flow	--	about 5 to about 60 sccm
Ar flow	--	about 5 to about 80 sccm
$\text{CHF}_3$ flow	--	about 5 to about 80 sccm.

*10*  
6. The process of Claim 3, wherein the ARC on the metallic layer has been used to prevent actinic light passing completely through the photoresist from being reflected from the metallic layer back through the photoresist during the *photo etching exposure* process.

*10*

*3.7.* The process of Claim 1, wherein the plasma generating device is evacuated to a pressure below 100 mTorr while etching the ARC with the etching agents.

*4.* The process of Claim 1, wherein the plasma generating device comprises an ECR reactor and the ARC is on a semiconductor substrate.

*5.9.* The process of Claim 1, wherein the ARC is on a semiconductor wafer.

*Sub A2* 10. The process of Claim 1, wherein the plasma generating device includes an antenna which forms the plasma by inductively coupling radio frequency energy into the reaction chamber.

*Sub 11.* 11. A method for substantially preserving a photoresist while removing exposed areas of an organic ARC during the manufacturing of an integrated circuit, comprising exposing the ARC to a system of etching agents in an ionized state in a reaction chamber of a plasma generating device, the system of etching agents including one or more fluorine-containing compounds, an inert carrier gas and chlorine.

*14.* 12. The method of Claim ~~11~~, wherein the one or more fluorine-containing compounds is trifluoromethane and the inert carrier gas is argon.

*17.12.* 13. The method of Claim ~~12~~, carried out within the following window  
Pressure -- about 1 to about 100 millitorr  
Temperature -- about 30° to about 80° C  
 $\text{Cl}_2$  flow -- about 5 to about 60 sccm  
Ar flow -- about 5 to about 80 sccm  
 $\text{CHF}_3$  flow -- about 5 to about 80 sccm.

*Sub X3* 14. An oxygen-free plasma etching gas formulation for removing an organic ARC on a metallic layer comprising one or more fluorine-containing compounds, an optional inert carrier gas and chlorine.

15. The formulation of Claim 14, wherein the one or more fluorine-containing compounds is CHF<sub>3</sub> and the inert carrier gas is argon.

Add  
PF<sub>4</sub>

Add  
B2